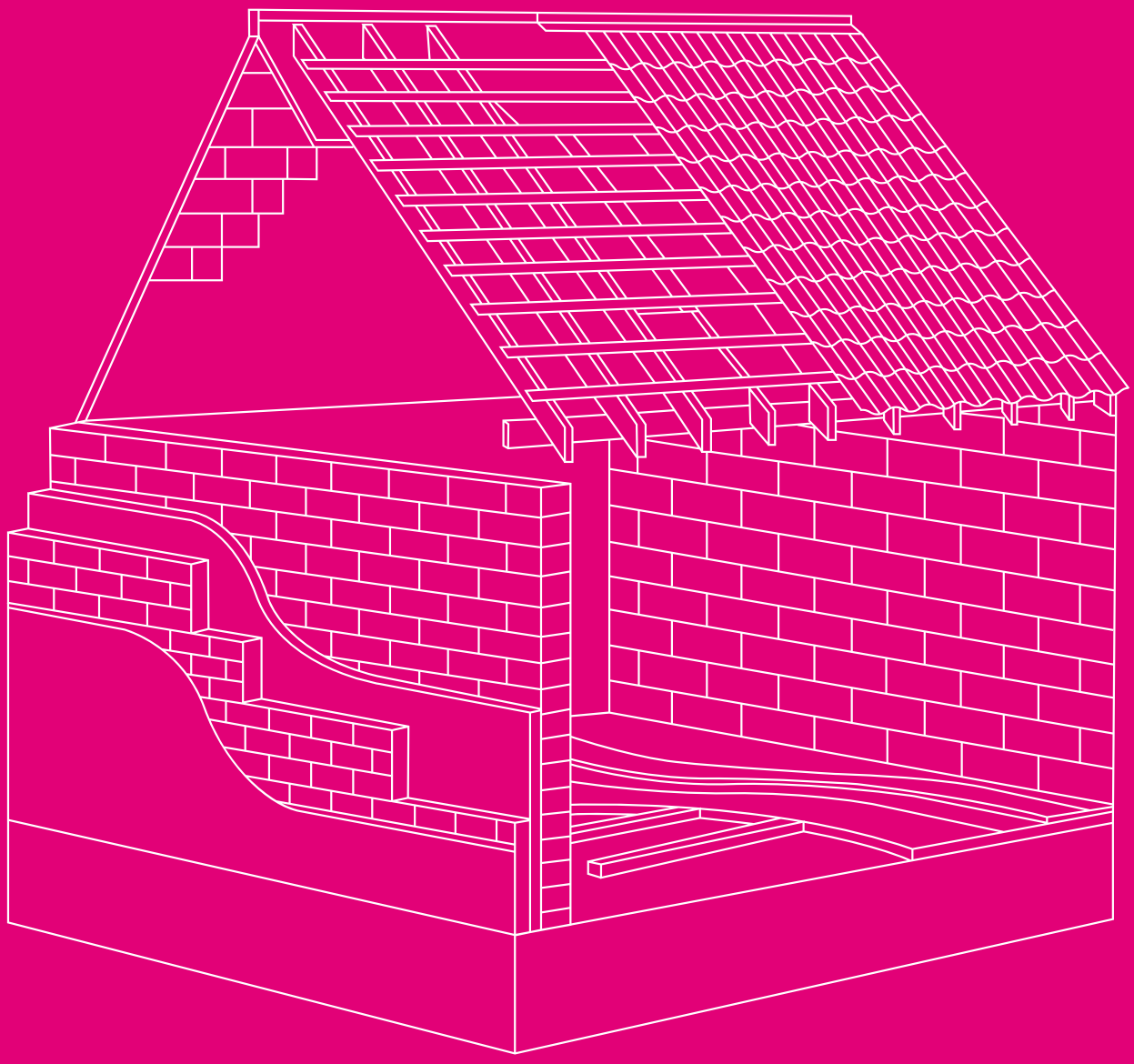
Celotex
by SOPREMA

Handy Guide

To Insulation



Contents

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PRODUCT INFORMATION

Celotex Product Disclaimer

When specifying and installing Celotex insulation boards you must ensure its technical specification meets or exceeds all relevant national Building Regulations and any other applicable standards/requirements relevant to your building/renovation project. Particular attention must be given to all specific fire and applicable height restrictions.

Celotex must not be used in the external walls of buildings over 11 metres in height.

Recent changes to Building Regulations mean that only non-combustible insulation or insulation of limited combustibility can be used in buildings of that height.

You and your building designer should refer to the relevant Building Regulations and guidance applicable to your particular construction or application. You should also consult with warranty providers and local authority building control before building works commence.

Website Links

Our website carries the latest and most up to date version of all documents. Please find the relevant links below:

Technical Datasheets: Click here

Declarations of Conformity: Click here

BBA Certificates: Click here

Health and Safety Datasheets: Click here

Celotex Certifications: Click here

Celotex Online U-value Calculator: Click here

Celotex Technical Support: Click here

Celotex Handy Guide
PRODUCT INFORMATION

Multi-Application Boards

Celotex TB4000

Celotex TB4000 is the thinnest range of our multi-application PIR insulation boards featuring a low emissivity foil facing.

THICKNESS
20-40mm
LAMBDA
0.022 W/m.K
BOARD SIZE
1200 x 2400mm
BBA CERTIFICATES
25/7318
25/7329

Product Code	Thickness (mm)	R-Value (m^2.K/W)
TB4020	20	0.90
TB4025	25	1.10
TB4030	30	1.35
TB4040	40	1.80

Celotex GA4000

Celotex GA4000 is the medium thickness range of our multi-application PIR insulation boards featuring a low emissivity foil facing.

THICKNESS
50-100mm
LAMBDA
0.022 W/m.K
BOARD SIZE
1200 x 2400mm
BBA CERTIFICATES
25/7318
25/7329

Product Code	Thickness (mm)	R-Value (m^2.K/W)
GA4050	50	2.25
GA4060	60	2.70
GA4070	70	3.15
GA4075	75	3.40
GA4080	80	3.60
GA4090	90	4.05
GA4100	100	4.50

Celotex XR4000

Celotex XR4000 is the thickest range of our multi-application PIR insulation boards featuring a low emissivity foil facing.

THICKNESS
110-200mm
LAMBDA
0.022 W/m.K
BOARD SIZE
1200 x 2400mm
BBA CERTIFICATES
25/7318
25/7329

Product Code	Thickness (mm)	R-Value (m^2.K/W)
XR4110	110	5.00
XR4120	120	5.45
XR4130	130	5.90
XR4140	140	6.35
XR4150	150	6.80
XR4165	165	7.50
XR4200	200	9.05

Thermal Laminate Boards

Celotex PL4000

Celotex PL4000 is range of polyisocyanurate (PIR) thermal laminate insulation boards with a kraft-paper facing, laminated to a piece of 12.5mm tapered edge plasterboard.

This provides insulation, plasterboard and vapour control as one product with multiple fixing options including adhesive bonding, where appropriate.

LAMBDA
0.022 W/m.K

BOARD SIZE
1200 x 2400mm

BBA CERTIFICATES
25/7360

Product Code*	Thickness (mm)	R-Value (m^2.K/W)
PL4025	37.5	1.20
PL4040	52.5	1.85
PL4050	62.5	2.30
PL4060	72.5	2.75
PL4065	77.5	3.00

*Last three digits of product code are thickness of insulation in mm. Total thickness includes additional 12.5mm plasterboard.

Celotex Handy Guide

Masonry Cavity Wall Boards

Celotex CW4000

Celotex CW4000 is the range of specialist polyisocyanurate (PIR) insulation boards designed for partial-fill cavity wall applications. BBA certified and sized to fit between wall ties, features straight edges and a low emissivity foil facing.

LAMBDA
0.022 W/m.K

BOARD SIZE
1200 x 2400mm

BBA CERTIFICATES
24/7312

Product Code	Thickness (mm)	R-Value (m^2.K/W)
CW4040	40	1.80
CW4050	50	2.25
CW4060	60	2.70
CW4075	75	3.40
CW4085	85	3.85
CW4100	100	4.50

Celotex Thermaclass Cavity Wall 21

Celotex Thermaclass Cavity Wall 21 is a lower lambda (0.021 W/m.K) specialist polyisocyanurate (PIR) insulation board designed for full-fill cavity wall applications.

BBA certified it features a tongue and groove engineered profile and low emissivity foil facing. Boards can be installed with up to a 10mm residual cavity (to support ease of installation and accommodate mortar squeeze) or as a full fill solution with no residual cavity.

Full specification, Installation and junction guidance can be found in the Celotex Thermaclass Cavity Wall 21 - Specification Guide

LAMBDA
0.021 W/m.K

BOARD SIZE
1190 x 450mm (net installed)

BBA CERTIFICATES
24/7312

Thickness (mm)	R-Value (m^2.K/W)
90	4.25
115	5.45
140	6.65

02

FLOOR INSULATION

P/A Ratio Explained

What is the P/A Ratio?

The P/A ratio in U-value calculations for floors represents the Perimeter-to-Area ratio of the floor. It is an important factor in determining the heat loss through the ground floor of a building.

Why is the P/A ratio important for U-values?

Heat loss through floors depends on how much of the floor is near the colder external environment (the perimeter) versus the warmer interior (the central area).

A higher P/A ratio means a greater proportion of the floor is exposed to external walls, leading to more heat loss.

A lower P/A ratio means the floor has more interior area compared to its perimeter, resulting in less heat loss.

How is the P/A ratio calculated?

P (Perimeter): The total internal length of the floor's exposed edges (the edges in contact with external walls, outside environment or unheated spaces). This would not include lengths of wall to heated spaces such as the existing house or party walls to neighbouring houses.

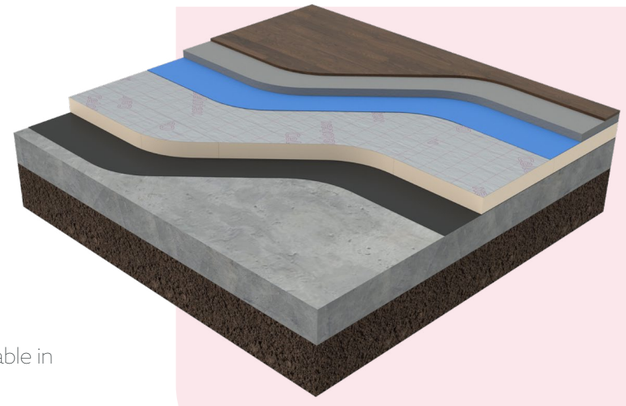
A (Area): The total internal surface area of the floor.

The P/A ratio is simply calculated as:

P/A ratio = Perimeter / Area

The P/A ratio is a critical parameter in U-value calculations for floors, as it directly influences thermal performance and insulation requirements.

Concrete Slab Floors



Celotex GA4000 and XR4000 PIR insulation are BBA certified for concrete slab floor applications, helping to reduce downward heat loss and ensuring compliance with or even exceeding thermal regulations.

With high compressive strength (140kPa), lightweight and easy to cut, handle, and install, these boards are available in various thicknesses to meet precise specifications.

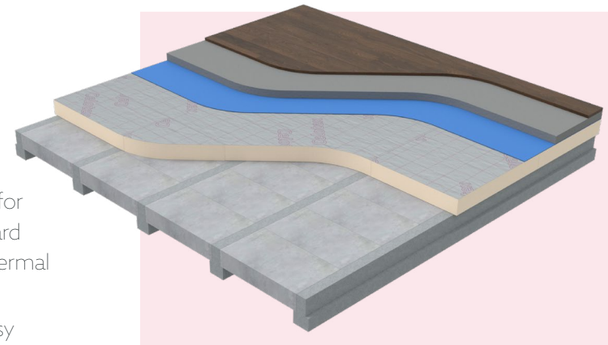
TB4000 insulation should be used for perimeter upstands to reduce thermal bridging.

Construction:
65mm Screed (with 25mm insulated upstand to reduce thermal bridging) | 500-gauge separating layer | Celotex Multi-Purpose Insulation | 1200-gauge Damp Proof Membrane | Concrete slab

	PERIMETER/AREA RATIO									
Product Code	**0.1**	**0.2**	**0.3**	**0.4**	**0.5**	**0.6**	**0.7**	**0.8**	**0.9**	**1.0**
XR4200	0.08	0.09	0.09	0.09	0.09	0.10	0.10	0.10	0.10	0.10
XR4165	0.09	0.10	0.11	0.11	0.11	0.11	0.11	0.11	0.12	0.12
XR4150	0.10	0.11	0.11	0.12	0.12	0.12	0.12	0.12	0.13	0.13
XR4140	0.10	0.11	0.12	0.12	0.13	0.13	0.13	0.13	0.13	0.13
XR4130	0.11	0.12	0.13	0.13	0.13	0.14	0.14	0.14	0.14	0.14
XR4120	0.11	0.12	0.13	0.14	0.14	0.15	0.15	0.15	0.15	0.15
XR4110	0.12	0.13	0.14	0.15	0.15	0.16	0.16	0.16	0.16	0.16
GA4100	0.12	0.14	0.15	0.16	0.16	0.17	0.17	0.17	0.18	0.18
GA4090	0.13	0.15	0.16	0.17	0.18	0.18	0.19	0.19	0.19	0.19
GA4080	0.14	0.16	0.18	0.19	0.19	0.20	0.20	0.21	0.21	0.21
GA4075	0.14	0.17	0.18	0.20	0.20	0.21	0.21	0.22	0.22	0.22
GA4070	0.15	0.17	0.19	0.20	0.21	0.22	0.22	0.23	0.23	0.23
GA4060	0.16	0.19	0.21	0.23	0.24	0.24	0.25	0.25	-	-
GA4050	0.17	0.21	0.23	0.25	-	-	-	-	-	-

Indicative U-Value (W/m².K) Calculation Table (Note: The last three digits of the product code indicate the insulation thickness in mm.)

Beam and Block Floors



Celotex GA4000 and XR4000 PIR insulation are BBA certified for Beam and Block floor applications, helping to reduce downward heat loss and ensuring compliance with or even exceeding thermal regulations.

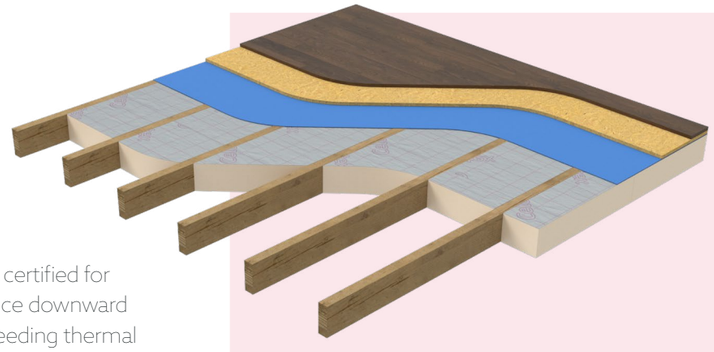
With high compressive strength (140kPa), lightweight and easy to cut, handle, and install, these boards are available in various thicknesses to meet precise specifications.

TB4000 insulation should be used for perimeter upstands to reduce thermal bridging

Construction:
65mm Screed (with 25mm TB4000 insulated upstand to reduce thermal bridging) | 500-gauge separating layer | Celotex Multi-Purpose Insulation | Suspended Beam and Block Ground Floor | Ventilated Void

	PERIMETER/AREA RATIO									
Product Code	**0.1**	**0.2**	**0.3**	**0.4**	**0.5**	**0.6**	**0.7**	**0.8**	**0.9**	**1.0**
XR4200	0.08	0.09	0.09	0.09	0.09	0.10	0.10	0.10	0.10	0.10
XR4165	0.09	0.10	0.11	0.11	0.11	0.11	0.11	0.11	0.12	0.12
XR4150	0.10	0.11	0.11	0.12	0.12	0.12	0.12	0.12	0.13	0.13
XR4140	0.10	0.11	0.12	0.12	0.13	0.13	0.13	0.13	0.13	0.13
XR4130	0.11	0.12	0.13	0.13	0.13	0.14	0.14	0.14	0.14	0.14
XR4120	0.11	0.12	0.13	0.14	0.14	0.15	0.15	0.15	0.15	0.15
XR4110	0.12	0.13	0.14	0.15	0.15	0.16	0.16	0.16	0.16	0.16
GA4100	0.12	0.14	0.15	0.16	0.16	0.17	0.17	0.17	0.18	0.18
GA4090	0.13	0.15	0.16	0.17	0.18	0.18	0.19	0.19	0.19	0.19
GA4080	0.14	0.16	0.18	0.19	0.19	0.20	0.20	0.21	0.21	0.21
GA4075	0.14	0.17	0.18	0.20	0.20	0.21	0.21	0.22	0.22	0.22
GA4070	0.15	0.17	0.19	0.20	0.21	0.22	0.22	0.23	0.23	0.23
GA4060	0.16	0.19	0.21	0.23	0.24	0.24	0.25	0.25	-	-
GA4050	0.17	0.21	0.23	0.25	-	-	-	-	-	-

Indicative U-Value (W/m².K) Calculation Table (Note: The last three digits of the product code indicate the insulation thickness in mm.)



Suspended Timber Floors

Celotex GA4000 and XR4000 PIR insulation are BBA certified for suspended timber floor applications, helping to reduce downward heat loss and ensuring compliance with or even exceeding thermal regulations.

Celotex is lightweight and easy to cut, handle, and install by friction fitting between joists. Boards are available in various thicknesses to meet precise specifications.

Construction:
18mm T+G chipboard flooring | 500-gauge Air and Vapour Control layer (AVCL) | Celotex Multi-Purpose Insulation between 47mm wide joists at 400 ctrs | Ventilated Void

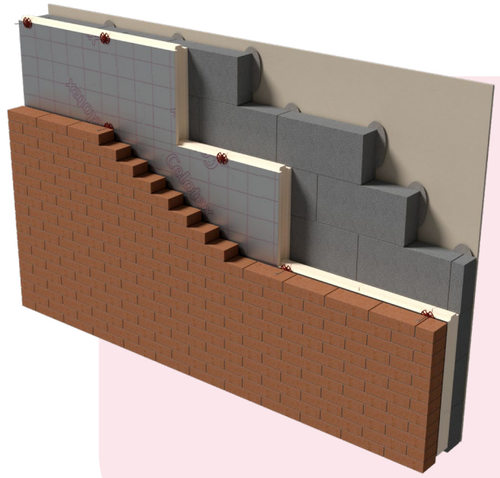
	PERIMETER/AREA RATIO									
Product Code	**0.1**	**0.2**	**0.3**	**0.4**	**0.5**	**0.6**	**0.7**	**0.8**	**0.9**	**1.0**
XR4200	0.11	0.12	0.13	0.14	0.14	0.14	0.14	0.14	0.15	0.15
XR4165	0.12	0.14	0.15	0.16	0.16	0.16	0.17	0.17	0.17	0.17
XR4150	0.13	0.15	0.16	0.17	0.17	0.18	0.18	0.18	0.18	0.18
XR4140	0.13	0.16	0.17	0.18	0.18	0.19	0.19	0.19	0.19	0.19
XR4130	0.14	0.16	0.18	0.19	0.19	0.20	0.20	0.20	0.20	0.21
XR4120	0.14	0.17	0.19	0.20	0.20	0.21	0.21	0.21	0.22	0.22
XR4110	0.15	0.18	0.20	0.21	0.22	0.22	0.23	0.23	0.23	0.23
GA4100	0.15	0.19	0.21	0.22	0.23	0.24	0.24	0.24	0.25	0.25
GA4090	0.16	0.20	0.22	0.24	0.25	0.25	-	-	-	-
GA4080	0.17	0.22	0.24	0.25	-	-	-	-	-	-
GA4075	0.17	0.22	0.25	-	-	-	-	-	-	-
GA4070	0.18	0.23	-	-	-	-	-	-	-	-
GA4060	0.19	0.25	-	-	-	-	-	-	-	-
GA4050	0.20	-	-	-	-	-	-	-	-	-

Indicative U-Value (W/m².K) Calculation Table (Note: The last three digits of the product code indicate the insulation thickness in mm.)

03

MASONRY CAVITY WALL INSULATION

Full-Fill Cavity Walls



Celotex Thermaclass Cavity Wall 21 is a lower lambda (0.021 W/m.K) specialist polyisocyanurate (PIR) insulation board designed for full-fill cavity wall applications.

BBA certified, it features a tongue and groove engineered profile and low emissivity foil facing. Boards can be installed with up to a 10mm residual cavity (to support ease of installation and accommodate mortar squeeze) or as a full-fill solution with no residual cavity.

Note: Corners must be protected with vertical DPC to avoid moisture ingress. Full Installation and junction guidance can be found in the **Celotex Thermaclass Cavity Wall 21 - Specification Guide**

Construction:
103mm brick | 10mm cavity | Celotex Thermaclass Cavity Wall 21 | 100mm block (as below) | plasterboard on dabs

	BLOCK TYPE & LAMBDA (W/m.K)			
Product Thickness (mm)	Dense (1.13)	Medium Dense (0.59)	Lightweight Concrete (0.25)	Aircrete (0.15)
140	0.13	0.13	0.13	0.12
115	0.16	0.15	0.15	0.15
90	0.19	0.19	0.18	0.18

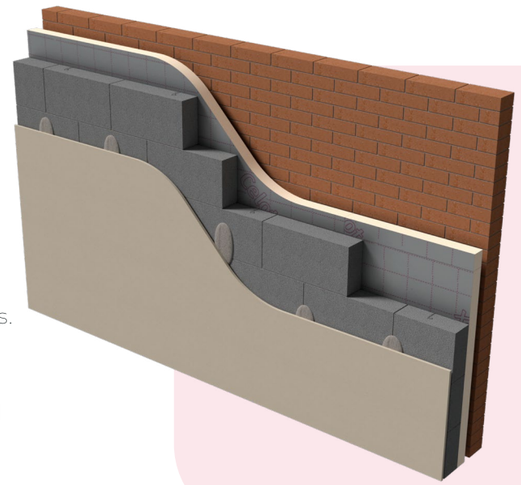
Indicative U-Value (W/m².K) Calculation Table

Construction:
Rendered dense block (external) | 10mm cavity | Celotex Thermaclass Cavity Wall 21 | 100mm block (as below) | plasterboard on dabs

	BLOCK TYPE & LAMBDA (W/m.K)			
Product Thickness (mm)	Dense (1.13)	Medium Dense (0.59)	Lightweight Concrete (0.25)	Aircrete (0.15)
140	0.13	0.13	0.13	0.12
115	0.16	0.15	0.15	0.15
90	0.19	0.19	0.18	0.18

Indicative U-Value (W/m².K) Calculation Table

Partial-Fill Cavity Walls



Celotex CW4000 is a specialist polyisocyanurate (PIR) insulation board designed for partial-fill cavity wall applications. BBA certified and sized to fit between wall ties, it features straight edges and a low emissivity foil facing.

Typically, a 50mm residual cavity is required to be maintained between the outer face of the cavity insulation and the inner face of the outer leaf.

Construction:
103mm brick | 50mm cavity (min) | Celotex CW4000 (as below) | 100mm block (as defined below) | Plasterboard on dabs

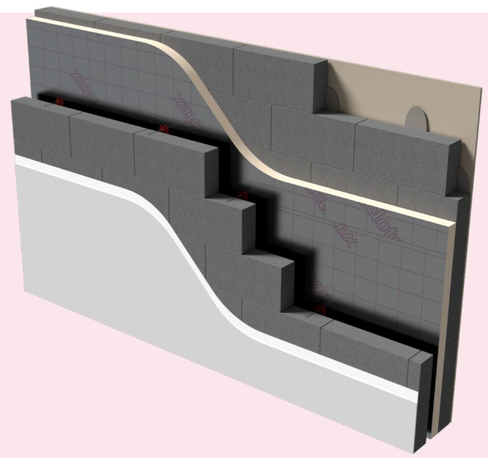
	BLOCK TYPE & LAMBDA (W/m.K)			
Product Code	Dense (1.13)	Medium Dense (0.59)	Lightweight Concrete (0.25)	Aircrete (0.15)
CW4100	0.17	0.17	0.17	0.16
CW4085	0.20	0.19	0.19	0.18
CW4075	0.22	0.21	0.20	0.20
CW4060	0.25	0.25	0.24	0.23
CW4050	0.28	0.28	0.26	0.25
CW4040	0.33	0.32	0.30	0.28

Indicative U-Value (W/m².K) Calculation Table

Celotex Handy Guide

MASONRY CAVITY WALL INSULATION

Partial-Fill Cavity Walls

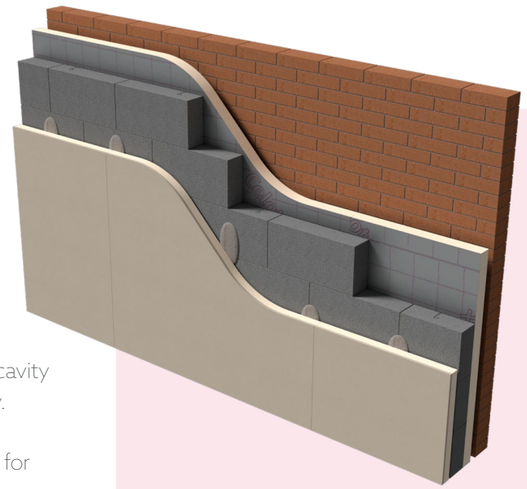


Construction:
Rendered dense block | 50mm cavity (min) | Celotex CW4000 | 100mm block (below) | Plasterboard on dabs

	BLOCK TYPE & LAMBDA (W/m.K)			
Product Code	Dense (1.13)	Medium Dense (0.59)	Lightweight Concrete (0.25)	Aircrete (0.15)
CW4100	0.17	0.17	0.17	0.16
CW4085	0.20	0.19	0.19	0.18
CW4075	0.22	0.21	0.20	0.20
CW4060	0.25	0.25	0.24	0.23
CW4050	0.29	0.28	0.27	0.25
CW4040	0.33	0.32	0.30	0.28

Indicative U-Value (W/m².K) Calculation Table
(Note: The last three digits of the product code indicate the insulation thickness in mm)

Partial-Fill with Plasterboard Laminate



Thermal laminates can be used internally to both existing and new cavity walls which have been insulated with Partial-Fill PIR within the cavity. Using PL4000 internally can help to improve airtightness as well as increase thermal performance. This provides an alternative solution for meeting the improved u-values required for Approved Document L.

Celotex PL4000 boards should be tightly butted and jointed to create the air and vapour control layer (AVCL).

Construction:
103mm brick | 50mm cavity | 50mm Celotex CW4000 | 100mm block (as below) | 15mm drywall adhesive (dot and dab) | Celotex PL4000

BLOCK TYPE & LAMBDA (W/m.K)

Product Code	Thickness (mm)	Dense (1.13)	Medium Dense (0.59)	Aircrete (0.15)
PL4065	77.5	0.15	0.15	0.14
PL4060	72.5	0.16	0.16	0.15
PL4050	62.5	0.17	0.17	0.16
PL4040	52.5	0.19	0.18	0.17
PL4025	37.5	0.21	0.21	0.19

Indicative U-Value ($W/m^2 \cdot K$) Calculation Table

(Note: The last three digits of the product code indicate the insulation thickness in mm. For PL4000, the total thickness includes an additional 12.5mm plasterboard.)

Construction:
103mm brick | 50mm cavity | 50mm Celotex CW4000 | 100mm block (as below) | Celotex PL4000 (mechanically fixed)

BLOCK TYPE & LAMBDA (W/m.K)

Product Code	Thickness (mm)	Dense (1.13)	Medium Dense (0.59)	Aircrete (0.15)
PL4065	77.5	0.16	0.16	0.15
PL4060	72.5	0.16	0.16	0.15
PL4050	62.5	0.18	0.17	0.16
PL4040	52.5	0.19	0.19	0.18
PL4025	37.5	0.22	0.22	0.20

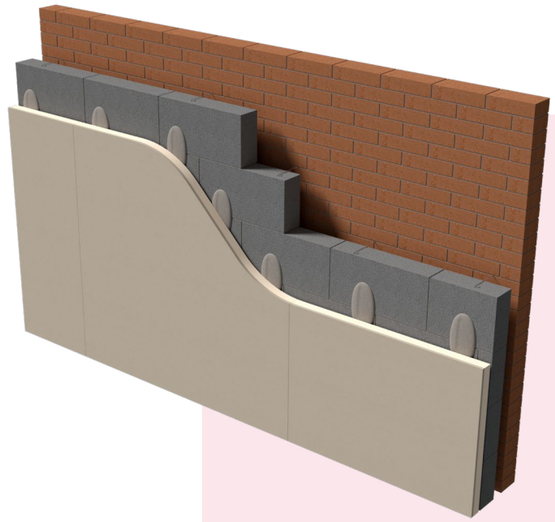
Indicative U-Value ($W/m^2 \cdot K$) Calculation Table

(Note: The last three digits of the product code indicate the insulation thickness in mm. For PL4000, the total thickness includes an additional 12.5mm plasterboard.)

Existing Cavity Walls

Thermal laminates can be considered internally to existing cavity walls. PL4000 internally can help to improve airtightness as well as increase thermal performance. This provides an alternative solution for meeting the improved u-values required for Approved Document L.

Celotex PL4000 boards should be tightly butted and jointed to create the air and vapour control layer (AVCL).



50mm Empty Cavity

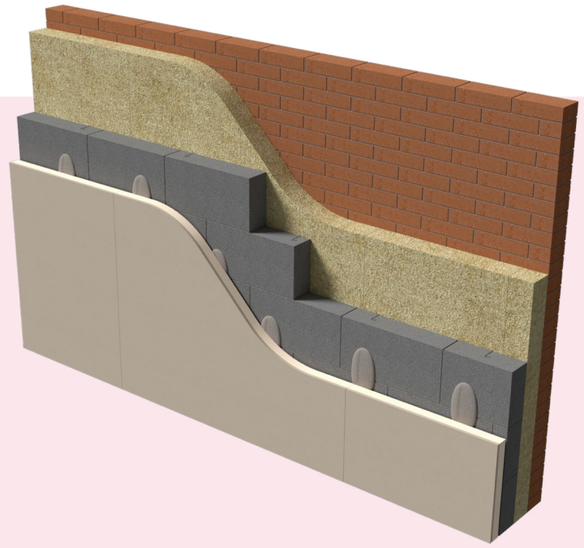
Construction:
103mm brick | 50mm empty cavity | 100mm dense block | 15mm drywall adhesive (dot and dab) | Celotex PL4000 (as below) – joints sealed as air and vapour control layer | Plaster skim 3mm

Product Code	Thickness (mm)	U-Value ($W/m^2.K$)
PL4065	77.5	0.27
PL4060	72.5	0.29
PL4050	62.5	0.33

Indicative U-Value ($W/m^2 \cdot K$) Calculation Table

(Note: The last three digits of the product code indicate the insulation thickness in mm. For PL4000, the total thickness includes an additional 12.5mm plasterboard.)

Existing Cavity Walls



50mm cavity filled with insulation

Construction:
103mm brick | 50mm cavity full-filled with 0.040 W.mK insulation (such as mineral wool) | 100mm dense block | 15mm drywall adhesive (dot and dab) | Celotex PL4000 (as below) – joints sealed as air and vapour control layer | Plaster skim 3mm

Product Code	Thickness (mm)	U-Value ($W/m^2.K$)
PL4065	77.5	0.21
PL4060	72.5	0.22
PL4050	62.5	0.24
PL4040	52.5	0.27
PL4025	37.5	0.34

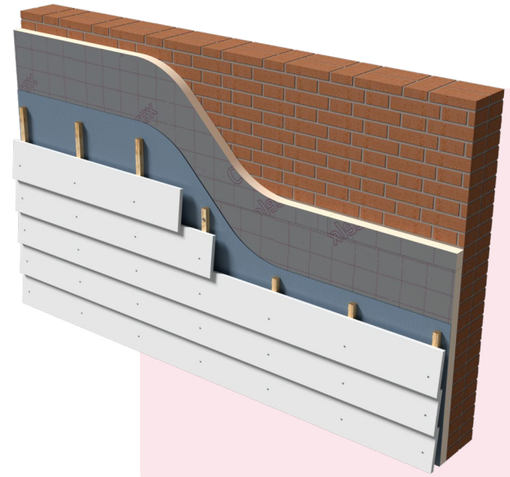
Indicative U-Value ($W/m^2 \cdot K$) Calculation Table

(Note: The last three digits of the product code indicate the insulation thickness in mm. For PL4000, the total thickness includes an additional 12.5mm plasterboard.)

04

SOLID MASONRY WALLS

External Wall Insulation (EWI)



External wall insulation is often the preferred choice in low rise residential retrofit because it can improve thermal performance whist preserving internal space, minimises disruption, and enhances the building's lifespan and appearance. It also aligns well with best practices for retrofits by improving building fabric and can reduce the risk of condensation.

GA4000 and XR4000 may be considered externally when protected by a breather membrane and external protection such as weatherboarding. Please note Celotex thermal insulation boards must not be used in the external walls of buildings over 11 metres in height.

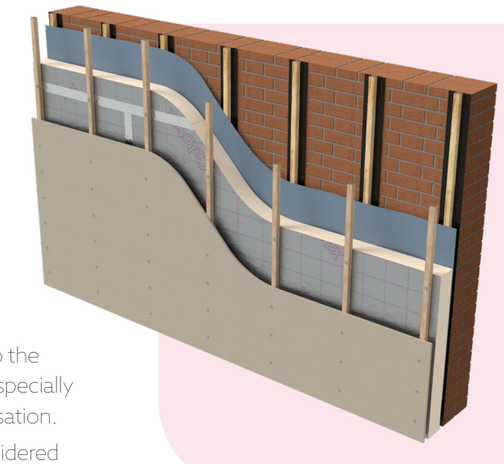
Construction:
Weatherboarding or Render on carrier system | 25mm ventilated and drained cavity between vertical battens | Breather membrane | Celotex multi-application board (see below) | 215mm brickwork | 13mm plaster

Product Code	Thickness (mm)	U-Value (W/m².K)
XR4200	200	0.10
XR4165	165	0.12
XR4150	150	0.13
XR4140	140	0.14
XR4130	130	0.15
XR4120	120	0.16
XR4110	110	0.18
GA4100	100	0.19
GA4090	90	0.21
GA4080	80	0.24
GA4075	75	0.25
GA4070	70	0.26
GA4060	60	0.30

Indicative U-Value ($W/m^2 \cdot K$) Calculation Table

(Note: The last three digits of the product code indicate the insulation thickness in mm.)

Internal Wall Insulation (IWI)



Insulation to the outer face of the wall is typically preferred, however sometimes is not possible. As part of a holistic approach to upgrading, you will also want to consider building fabric, airtightness, and controlled ventilation along with improvements in thermal performance. Specialist advice should be sought from a certified retrofit specialist in relation to the correct solution for the solid wall for each individual property, especially in relation to moisture movement and the potential of condensation.

For exposed solid masonry, GA4000 and XR4000 may be considered as moisture closed solution where ventilated cavities are introduced between the existing wall and insulation. Various potential solutions have been outlined below.

Multi-Application Boards on Vented Batten Void

Construction:
Existing Masonry (such as 215mm brickwork) | 25mm ventilation cavity between vertical battens on DPC strips | Breather membrane | Celotex multi-application insulation board (as below) – joints taped as AVCL | Service void formed by 25x47mm battens at 600 ctrs | 12.5mm plasterboard

Product Code	U-Value (W/m².K)
GA4100	0.18
GA4090	0.20
GA4080	0.22
GA4075	0.23
GA4070	0.24
GA4060	0.27

Indicative U-Value (W/m²·K) Calculation Table

(Note: The last three digits of the product code indicate the insulation thickness in mm.)

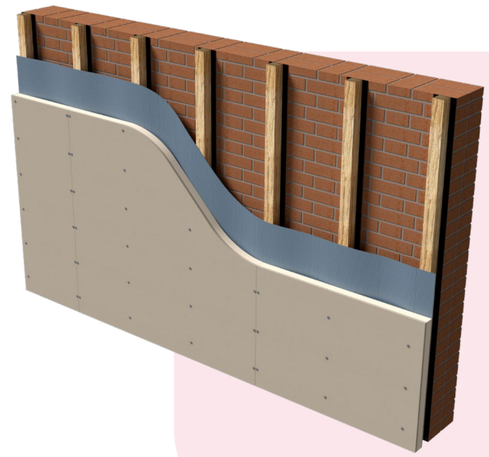
Thermal Laminate on Vented Batten Void

Construction:
Existing masonry (such as 215mm brickwork) | 25mm ventilation cavity between vertical battens on DPC strips | Breather membrane | PL4000 over studs – joints sealed as AVCL | 3mm plaster skim

Product Code	Thickness (mm)	U-Value (W/m².K)
PL4065	77.5	0.30
PL4060	72.5	0.33

Indicative U-Value (W/m²·K) Calculation Table

(Note: last three digits of product code are thickness of insulation in mm. Total thickness includes 12.5mm plasterboard)



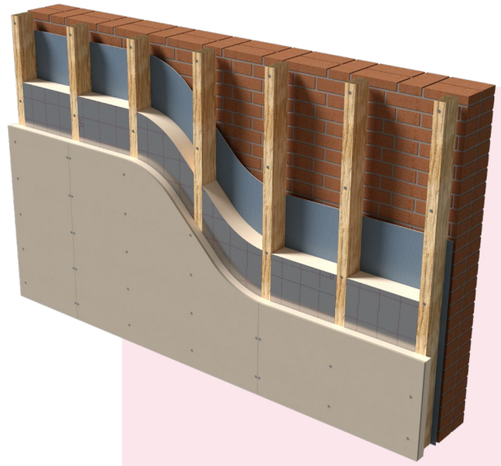
Vented Void with Celotex Between and Over Timber Stud Frame

Construction:
Existing masonry (such as 215mm brickwork) | 25mm ventilation cavity | Breather membrane fixed to back of studs | GA4100 between 100mm timber studs (15% bridging) | PL4000 over studs – joints sealed as AVCL (As below) | 3mm plaster skim

Product Code	Thickness (mm)	U-Value (W/m².K)
PL4060	72.5	0.16
PL4050	62.5	0.18
PL4040	52.5	0.19
PL4025	37.5	0.22

Indicative U-Value (W/m²·K) Calculation Table

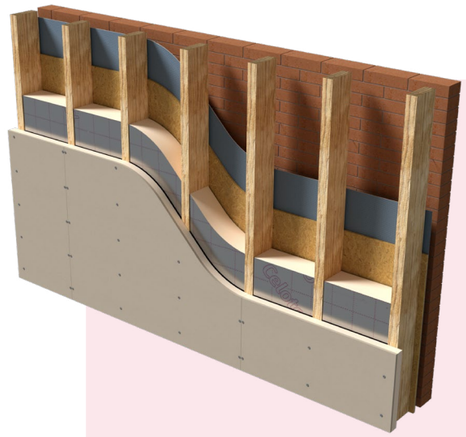
(Note: The last three digits of the product code indicate the insulation thickness in mm. For PL4000, the total thickness includes an additional 12.5mm plasterboard.)



05

TIMBER FRAME WALLS

Brick Outer Leaf - Insulation Between and Inside Studs



Celotex GA4000, XR4000 and Celotex PL4000 high thermal performance insulation boards can be considered in timber frame wall lining applications.

A common solution for a timber-framed wall, is Celotex GA4000 or XR4000 installed between the studs pushed against the sheathing board, with PL4000 over the face of the studs on the warm side, reducing thermal bridging.

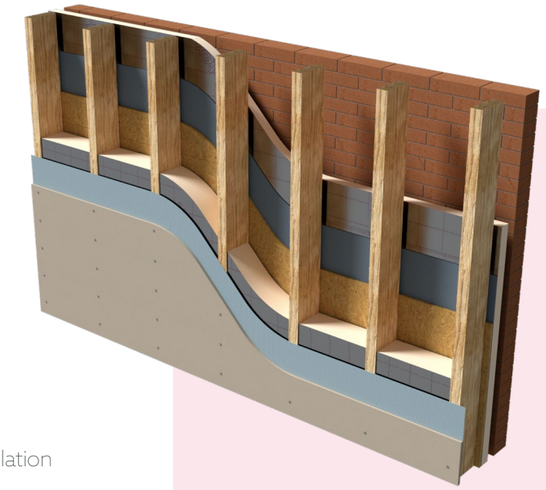
Construction:
102.5mm brickwork | 50mm cavity | 9mm plywood/OSB | Celotex multi-application board between studs (15% bridging) | residual cavity between studs (15% bridging) | PL4000 over studs – joints sealed as AVCL (as below) | 3mm plaster skim

		Stud Thickness (mm)	
		100	140
		Insulation Between Studs	
		GA4075	XR4120
Product Code	Thickness (mm)	U-Value (W/m².K)	
PL4065	77.5	0.16	0.13
PL4060	72.5	0.16	0.13
PL4050	62.5	0.17	0.14
PL4040	52.5	0.19	0.15
PL4025	37.5	0.22	0.17

Indicative U-Value (W/m²·K) Calculation Table

(Note: The last three digits of the product code indicate the insulation thickness in mm. For PL4000, the total thickness includes an additional 12.5mm plasterboard.)

Brick Outer Leaf - Insulation Between and Outside Studs



Celotex GA4000 and XR4000 high thermal performance insulation can be considered in timber frame wall lining applications.

Another common solution for a timber-framed wall, is Celotex GA4000 or XR4000 installed between the studs pushed against the sheathing board, with GA4000 or XR4000 sheathing the studs on the external side, reducing thermal bridging.

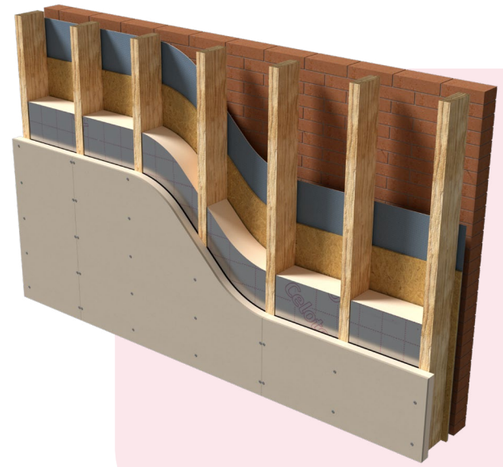
Construction:
102.5mm brickwork | 50mm cavity | Celotex multi-application board sheathing studs (as below) | Breather membrane | 9mm Plywood/OSB | Celotex multi-application board between studs (15% bridging) | Residual cavity between studs (15% bridging) | Polythene 1000 gauge VCL | 12.5mm plasterboard | 3mm plaster skim

	Stud Thickness (mm)	
	100	140
	Insulation Between Studs	
	GA4075	XR4120
Product Code	**U-Value (W/m².K)**	
GA4075	0.15	0.12
GA4070	0.15	0.12
GA4060	0.16	0.13
GA4050	0.17	0.14

Indicative U-Value (W/m²·K) Calculation Table

(Note: The last three digits of product code are thickness of insulation in mm.)

Dormer Cheeks/ Non-Brick Clad - Insulation Between and Inside Studs



Celotex GA4000, XR4000 and Celotex PL4000 high thermal performance insulation can be considered in timber frame wall applications such as dormer cheeks.

A common solution for a timber-framed wall, is Celotex GA4000 or XR4000 installed between the studs pushed against the sheathing board, with PL4000 over the face of the studs on the warm side, reducing thermal bridging.

Construction:
Weatherboarding / tiles / lead on ply/ render on board | 25mm (min) ventilated cavity batten air space | 9mm plywood/OSB | 75mm Celotex GA4075 between 100mm studs (15% bridging) | 25mm residual cavity between 100mm studs (15% bridging) | PL4000 over studs – joints sealed as AVCL (as below) | 3mm plaster skim

Product Code	Thickness (mm)	U-Value (W/m².K)
PL4065	77.5	0.16
PL4060	72.5	0.17
PL4050	62.5	0.18
PL4040	52.5	0.20
PL4025	37.5	0.23

Indicative U-Value (W/m²·K) Calculation Table

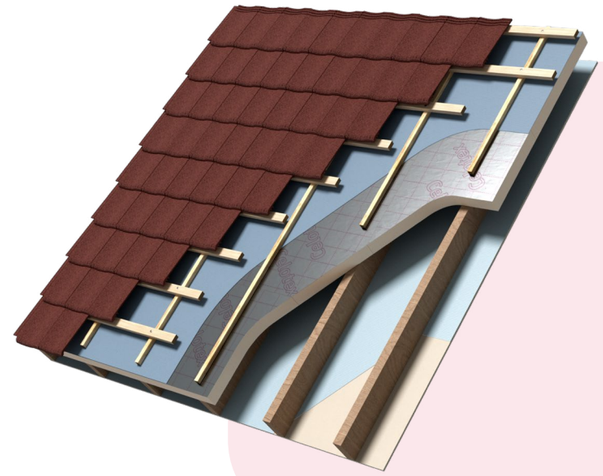
(Note: The last three digits of the product code indicate the insulation thickness in mm. For PL4000, the total thickness includes an additional 12.5mm plasterboard.)

06

WARM PITCHED ROOFS

Insulation Over Rafter (Sarking)

Celotex GA4000 or XR4000 can be considered for over-rafter insulation which can help to achieve a well-insulated, airtight building with a useful and comfortable habitable room in the roof space. Installing insulation over rather than between the rafters eliminates concerns about thermal bridging and, overall, saves on the total thickness of insulation used and the time for installation.



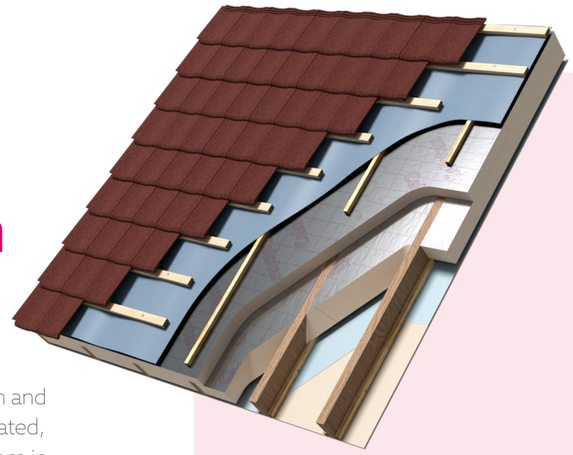
Construction:
Roof tiles | 25mm batten space | 38mm counter batten | Breather membrane | Celotex multi-application board (see below) | 150mm cavity formed by rafter space | Polythene 1000-gauge AVCL| 12.5mm plasterboard

Product Code	U-Value (W/m².K)
XR4200	0.10
GA4090 (2x90mm)	0.11
XR4165	0.12
XR4150	0.14
XR4140	0.14
XR4130	0.15
XR4120	0.17
XR4110	0.18
GA4100	0.20
GA4090	0.22
GA4080	0.24
GA4075	0.25

Indicative U-Value (W/m²·K) Calculation Table

(Note: The last three digits of the product code indicate the insulation thickness in mm.)

Insulation Between and Over Rafters



Celotex GA4000 or XR4000 can be considered for between and over-rafter insulation which can help to achieve a well-insulated, airtight building with a useful and comfortable habitable room in the roof space without impacting head height.

Please note that insulation over the rafters must be equal to or greater than the insulation between the rafters to reduce condensation risks.

Construction:
Roof tiles | 25mm batten space | 38mm counter batten | Breather membrane | Celotex multi-application board (as below) over rafters | Celotex multi-application board (as below) between 147mm rafters @ 400ctrs | Cavity formed by rafter space (low emissivity) | Polythene 1000-gauge AVCL | 12.5mm plasterboard skim

Product Code	U-Value (W/m².K)
XR4200	0.10
XR4110	0.11
GA4100	0.12
GA4090	0.13
GA4080	0.14
GA4075	0.15
GA4070	0.16
GA4060	0.18

Indicative U-Value (W/m²·K) Calculation Table

(Note: The last three digits of the product code indicate the insulation thickness in mm.)

Celotex Handy Guide
WARM PITCHED ROOFS

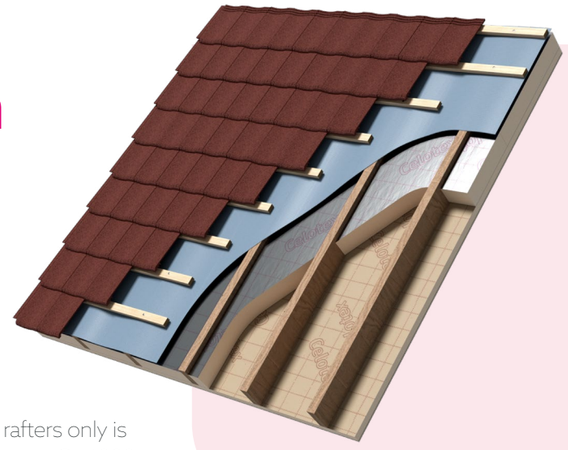
07

UNVENTILATED PITCHED ROOF

An unventilated roof with a breather membrane is a sealed roofing system that relies on a breathable underlay to allow moisture to escape while preventing water ingress. It eliminates the need for traditional ventilation by permitting vapour diffusion through the membrane to reduce condensation risk within the roof structure.

A drape space into the rafter of 15-25mm is required between the insulation and the breather membrane. Insulation can fully fill the rafter void only if counter battens are installed to form a drainage path.

Insulation Between and Under Rafters with PL4000



Arguably the most popular pitched roof solution, installing insulation between and under the rafters uses the depth of the structural timbers to best effect.

Modern U-value targets mean installing insulation between rafters only is rarely a viable option. Using a thermally efficient material such as GA4000 or XR4000 to get the maximum benefit from as much of the rafter depth as possible means the under-rafter insulation layer such as PL4000 can be kept to a minimum, making installation easier.

Celotex PL4000 boards should be tightly butted and jointed to create the air and vapour control layer (AVCL).

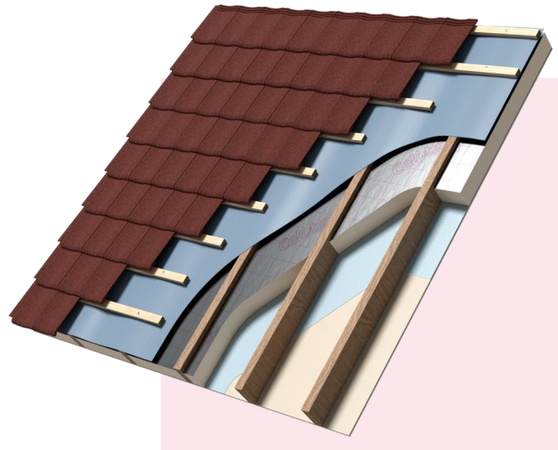
Construction:
Roof tiles | 25mm batten space | Breather membrane | Cavity formed by drape space between rafters | Celotex multi-application board (as below) between rafters @ 400ctrs | Celotex PL4000 (as below)- board joints taped as AVCL | 3mm plaster skim

	Rafters Thickness (mm)			
	100	125	150	175
	Insulation Between Rafters			
	GA4075	GA4100	XR4120	XR4150
Insulation Below Rafters	U-Value (W/m².K)			
PL4065	0.16	0.14	0.13	0.12
PL4060	0.17	0.15	0.14	0.12
PL4050	0.18	0.16	0.15	0.13
PL4040	0.20	0.17	0.16	0.14
PL4025	0.24	0.20	0.18	0.15

Indicative U-Value (W/m²·K) Calculation Table

(Note: The last three digits of the product code indicate the insulation thickness in mm. For PL4000, the total thickness includes an additional 12.5mm plasterboard.)

Insulation Between Rafters Only



Modern U-value targets mean installing insulation between rafters only is rarely a viable option. Internal restrictions, like maintaining sufficient head height, can mean that fixing the insulation between and under the rafters is not an option either. If you are creating a habitable area when renovating an existing loft space, the insulation line will need to be within the pitched (sloped) part of the roof – so insulation will need to be installed between the timber rafters to provide protection to the newly-created habitable area from external temperature fluctuations.

Construction:
25mm batten space | Breather membrane | Cavity formed by drape space between rafters (typically 15-25mm) | Celotex multi-application board (as below) between rafters | Polythene, 1000-gauge VCL | 12.5mm plasterboard | 3mm plaster skim

	Rafters Thickness (mm)					
	150	175	200	150	175	200
	400ctrs			600ctrs		
Insulation Between Rafters	U-Value (W/m².K)					
XR4200	-	-	0.17*	-	-	0.16*
XR4165	-	0.19*	0.18	-	0.18	0.17
XR4150	-	0.20	0.19	0.20*	0.19	0.18
XR4140	-	0.21	0.20	0.21	0.19	0.19

Indicative U-Value (W/m²·K) Calculation Table

(Note: The last three digits of product code are thickness of insulation in mm.)

*Counter battens used over breather membrane

08

VENTILATED PITCHED ROOF

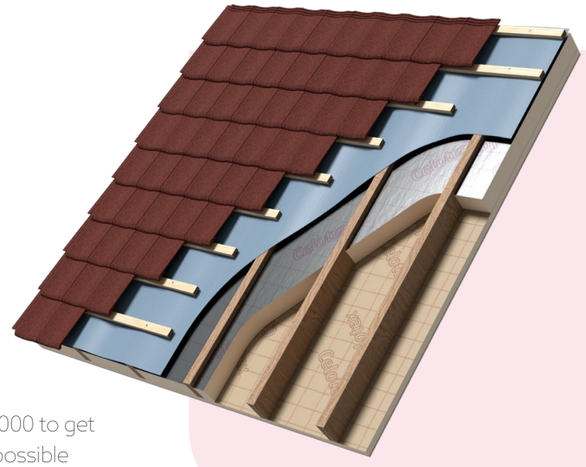
A ventilated roof is required where there is a high vapour resistance layer above the insulation such as sarking felt or sarking boards. Ventilation gaps at the eaves and ridge are essential to permit airflow between the felt and insulation to allow moisture vapour to escape, preventing condensation and maintaining a dry roof structure.

50mm is typically prescribed for this ventilation void.

Celotex Handy Guide

VENTILATED PITCHED ROOF

Insulation Between and Under Rafters with PL4000



Arguably the most popular pitched roof retrofit solution, installing insulation between and under the rafters uses the depth of the structural timbers to best effect.

Using a thermally efficient material such as GA4000 or XR4000 to get the maximum benefit from as much of the rafter depth as possible means the under-rafter insulation layer such as PL4000 can be kept to a minimum, making installation easier.

Celotex PL4000 boards should be tightly butted and jointed to create the air and vapour control layer (AVCL).

Construction:
Roof tiles | 25mm batten space | Sarking felt | 50mm ventilated cavity space between rafters | Celotex multi-application board (as below) between rafters @ 400ctrs | Celotex PL4000 (as below) - board joints taped as AVCL | 3mm plaster skim

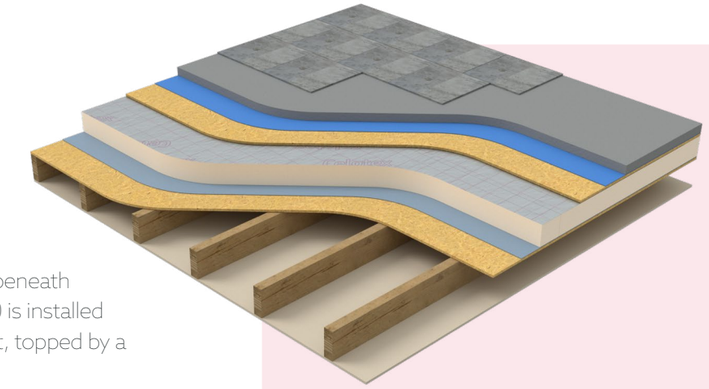
	Rafters Thickness (mm)			
	100	125	150	175
	Insulation Between Rafters			
	GA4050	GA4075	XR4100	XR4120
Insulation Below Rafter	**U-Value (W/m².K)**			
PL4065	0.20	0.18	0.15	0.14
PL4060	0.21	0.18	0.16	0.15
PL4050	0.24	0.20	0.17	0.16
PL4040	0.27	0.22	0.19	0.17
PL4025	0.33	0.26	0.22	0.19

Indicative U-Value (W/m²·K) Calculation Table
(Note: The last three digits of the product code indicate the insulation thickness in mm. For PL4000, the total thickness includes an additional 12.5mm plasterboard.)

09

FLAT ROOFS

Warm Flat Roof



A warm flat roof, as defined in BS 5250, has insulation positioned above the structural deck, keeping it warm and preventing condensation. This design eliminates the need for ventilation and incorporates an air and vapour control layer (AVCL) beneath the insulation to regulate moisture. Celotex XR4000 is installed above the AVCL, with a plywood or OSB deck over it, topped by a waterproof membrane for protection.

Celotex does not support the use of its products in or as part of hybrid flat roof constructions, where insulation is installed both between and over the joists in a timber flat roof.

Please note Celotex does not offer solutions that have been Broof (T4) tested for external fire performance compliance, for more information on Soprema Broof (T4) tested systems please visit **here**

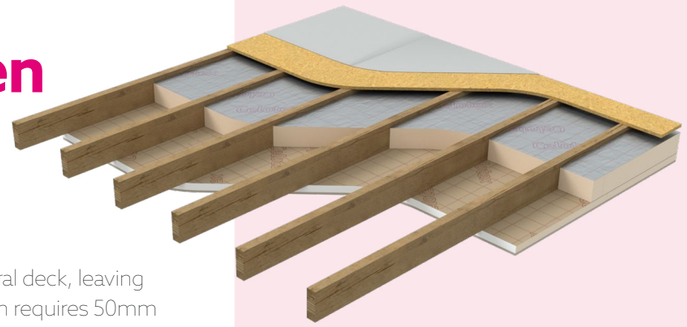
Construction:
Built-up roofing or single ply membrane | 18mm plywood/OSB | Celotex multi-application board (as below) | Polythene 1000 gauge, AVCL | 18mm plywood/OSB | 150mm cavity between joists @ 400 ctrs | 12.5mm plasterboard

		Roof Type		
		Built up Roof	Single Ply Membrane	SPM with Exposed Joists
Insulation Below Rafter	**Thickness (mm)**			**U-Value (W/m².K)**
XR4110 x2	220	0.10	0.11	0.11
XR4200	200	0.11	0.12	0.12
GA4090 x2	180	0.13	0.13	0.13
XR4165	165	0.14	0.14	0.14
XR4150	150	0.15	0.15	0.16
XR4140	140	0.16	0.16	0.17
XR4130	130	0.17	0.17	0.18
XR4120	120	0.18	0.18	0.19

Indicative U-Value ($W/m^2 \cdot K$) Calculation Table

(Note – last three digits of product code are thickness of insulation in mm.)

Cold Flat Roof: Insulation Between and Under Joists with PL4000



A cold flat roof has insulation placed below the structural deck, leaving the deck exposed to external temperatures. This design requires 50mm cross-ventilation above the insulation, typically within the joists, to prevent condensation. Using a thermally efficient material such as GA4000 or XR4000 to get the maximum benefit from as much of the joist depth as possible means the under-rafter insulation layer such as PL4000 can be kept to a minimum, making installation easier.

Celotex PL4000 boards should be tightly butted and jointed to create the air and vapour control layer (AVCL).

Please note that as per BS 5250, cold roofs should not be used for large roofs exceeding 5 meters. BS 6229 also advises against the use of this type of roof in general and specifically for roofs larger than 5 meters. We recognise that in some cases, this may be the only feasible solution. In such instances, it is the responsibility of the designer or customer to ensure that all necessary ventilation requirements are met and to consult with building control to confirm compliance.

Construction:
Weatherproofing system | 18mm plywood | 50mm ventilated cavity space between joist @ 400 ctrs | Celotex multi-application board (as below) between joists @ 400ctrs | Celotex PL4000 (as below) - board joints taped as AVCL | 3mm plaster skim

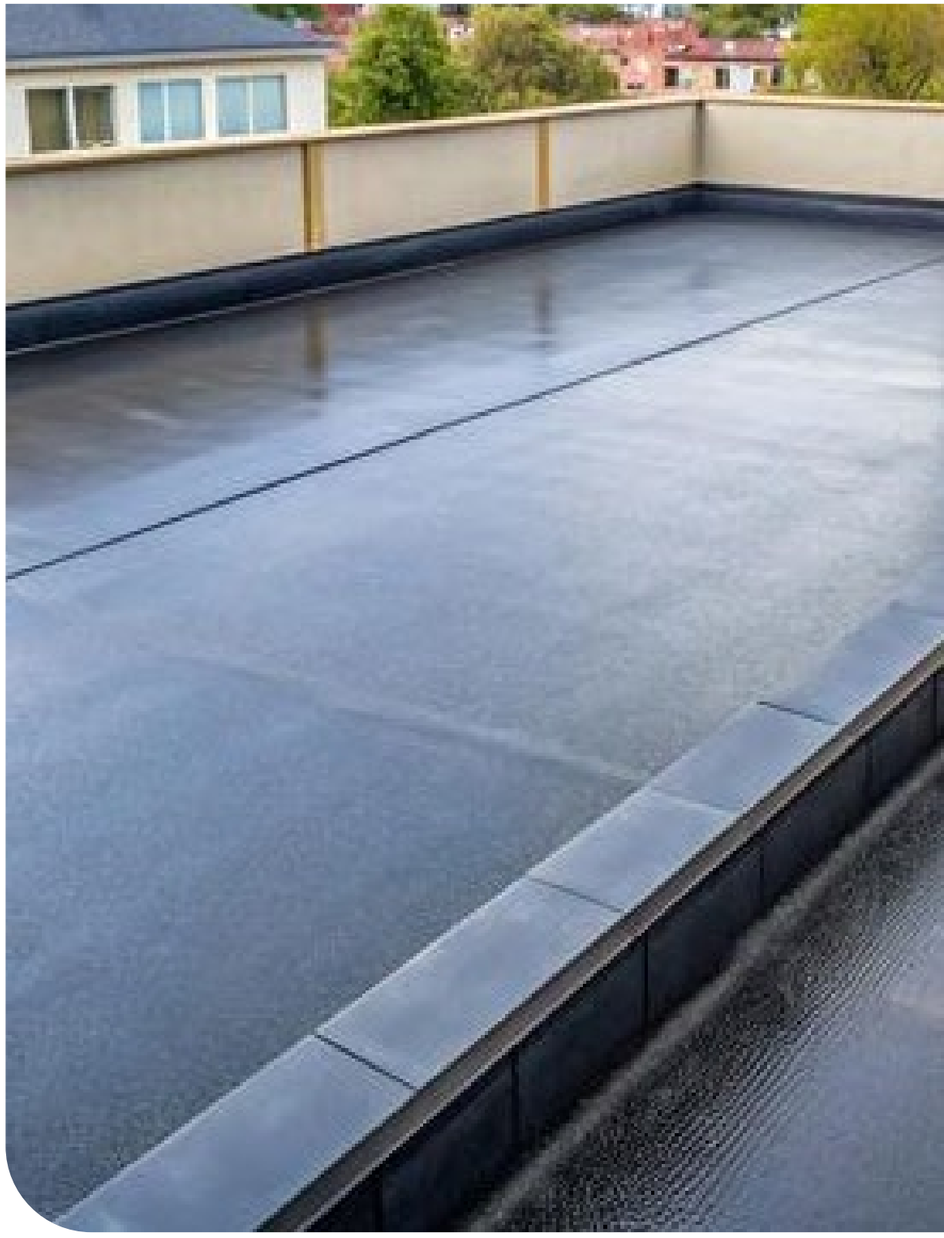
	Joist Thickness (mm)			
	100	125	150	175
	Insulation Between Joists			
	GA4050	GA4075	XR4100	XR4120
Insulation Below Rafter	**U-Value (W/m².K)**			
PL4065	0.20	0.18	0.15	0.14
PL4060	0.21	0.18	0.16	0.15
PL4050	0.24	0.20	0.17	0.16
PL4040	0.27	0.22	0.19	0.17
PL4025	0.33	0.26	0.22	0.19

Indicative U-Value (W/m²·K) Calculation Table

(Note: The last three digits of the product code indicate the insulation thickness in mm. For PL4000, the total thickness includes an additional 12.5mm plasterboard.)

Celotex Handy Guide

FLAT ROOFS



10

GENERAL INFORMATION

Installation and Handling

It is critical that all works are detailed in accordance to BBA certificate guidance, which is available **here**

Wear protective gloves when carrying or handling insulation boards to protect your hands from sharp edges (due to the aluminium facer). Wash hands thoroughly after handling as a matter of good occupational hygiene.

Cutting and drilling insulation boards will release dust. Inhalation of dust may cause respiratory irritation and other health conditions. Any such activity should be carried out in a well-ventilated area, wearing a dust mask and safety glasses. Dust from the process should be collected and disposed of appropriately. If in doubt following inhalation of dust, seek medical attention promptly.

When cutting the boards, use a sharp specialist insulation saw or knife. Use a straight edge to ensure an accurate butt edge or mitre joint.

If a board is damaged, it should not be used.

Ensure that all exposed areas of insulation are protected with a weatherproof material or board when work is suspended or during rain.

When handling boards in wet conditions, the facings can become slippery.

The foil facer on the boards will reflect ultraviolet light so UV eye protection may be required during bright weather.

The boards feature a branded foil facer on one side and an unbranded facer on the other. This is for cosmetic reasons only, there is no performance variation between these facers.

Seek specific advice directly from the relevant manufacturer for any ancillary items such as wall ties, breather membranes or fixings.

Storage

Celotex PIR boards must be protected from prolonged exposure to sunlight. To avoid contact with ground moisture, it should be stored dry, flat, and raised above ground level.

Where possible, packs should be stored inside. If stored outside, they should be under cover or protected with opaque polythene sheeting. If boards are stored under tarpaulins, care should be taken to prevent rope damage.

Only as much material as can be installed during a single working period should be removed from storage at any one time.

Boards left outside will deteriorate over time. Damaged boards should not be used.

Waste Management and Recycling

Celotex continuously monitors waste levels from its operations and implements procedures to minimise waste production. The company ensures that all employees understand the importance of waste reduction in every aspect of their work.

Celotex uses protective packaging for its products during transit that contains recycled materials and is also recyclable. This includes stretch wrap, cardboard banding, chipboard or wood bearers, and plastic strapping.

Waste PIR is inert and can be disposed of in landfills without any known impact on groundwater. Surplus product should be disposed of through a licensed waste disposal contractor.

Celotex at your service:

Do you have a question about a specific project, the products or application possibilities?
Then contact our technical team at:
technical@celotex.co.uk

All information can be found on:
www.celotex.co.uk

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